Software Technology Support Center (STSC)

Helping Government Organizations Buy and Build Software Better

Independent Expert Program Review (IEPR):

A Physical Exam of Your Project

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S T S C

Medical Checkups

- **Do you visit your doctor periodically?**
  - Even if you feel good
- **Do you visit your doctor before important events?**
  - Such as marriage or foreign travel
- **What does your doctor always do when you are sick or injured?**
  - Answer: history and/or mini-physical

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- **Expert at medical affairs**
- **Confidential**
- **Independent and objective**
- **Working towards fulfilling your health goals**

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Program Checkups

- **Is your program assessed periodically?**
  - Even if everything is fine
- **Is your program assessed before important events?**
  - Such as milestone decisions
- **What happens when a programmatic crisis occurs?**
- **Who is your program's "doctor"?**
  - Diagnosis, prognosis, and treatment plans

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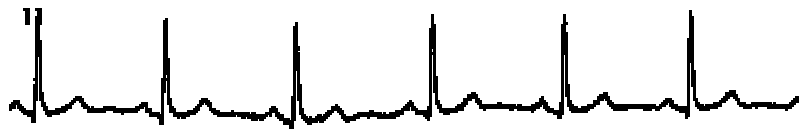
- **Goals**
  - Explain benefits and costs of IEPRs
    - Bottom line - cost effective technology for helping program managers successfully acquire software
  - Motivate their use where appropriate
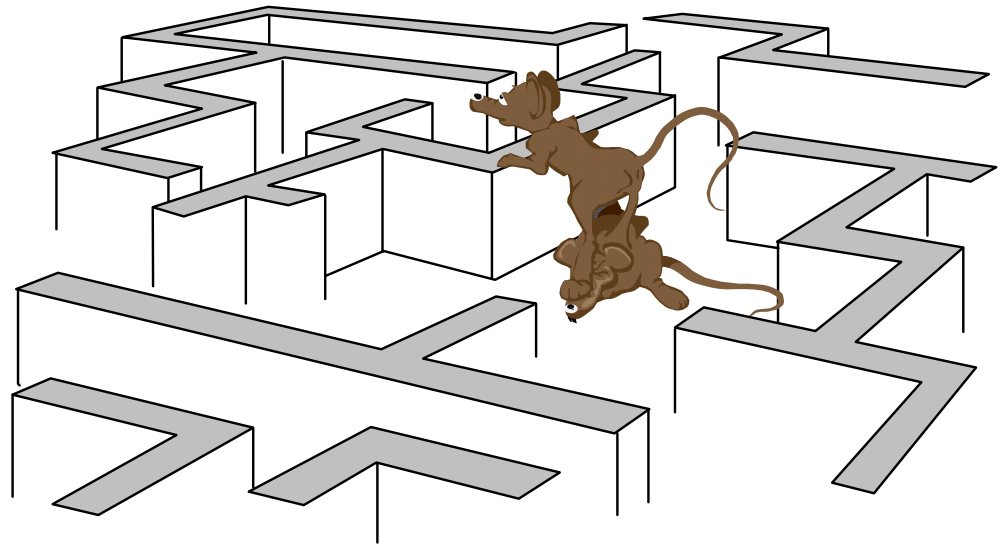   - Program plans should include IEPRs

- **What is an IEPR?**

- **What are the benefits of an IEPR?**
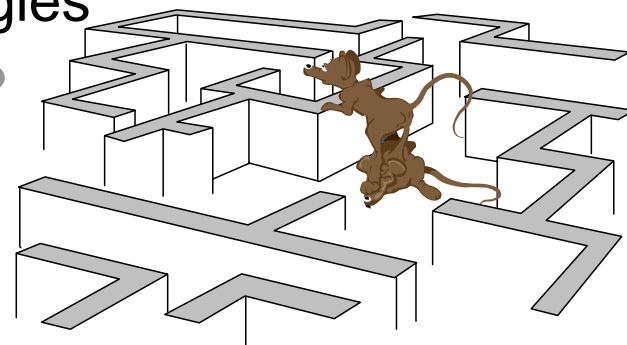
- **What is the cost of an IEPR?**

- **Typical findings**

- **What is an IEPR?**
  - IEPR definition
  - What is the policy regarding IEPRs
  - IEPR process
  - Who conducts IEPRs
  - What technologies are used during IEPRs
  - What is the culture of an IEPR
  - Comparison with similar methodologies
- **What are the benefits of an IEPR?**
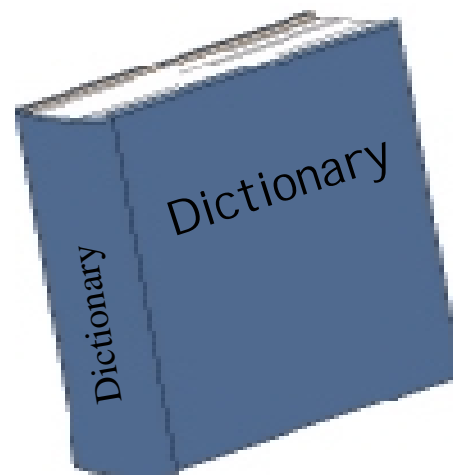- **What is the cost of an IEPR?**
- **Typical findings**

- ## **A review of a program (or project)**
  - For the program management
  - To increase program stability and reduce program risk
  - Conducted by an independent and objective group of experts

IEPR vs Medical Checkup

- **IEPR: A review of a program (or project)**

    - For the program management

    - To increase program stability and reduce program risk

    - Conducted by an independent and objective group of experts

- **Key attributes of MDs**

    - Expert at medical affairs

    - Confidential

    - Independent and objective

    - Working towards fulfilling your health goals

    - Performs physicals

Defense Science Board

- **Charter**
  - Review software development and acquisition in the DoD
- **Basic finding**
  - Undisciplined execution
- **Recommendations**
  - Stress past performance and process maturity
  - Restructure contract initiatives
  - Collect, disseminate, and employ best practices
  - **Independent expert reviews**
  - Improve software skills of acquisition and program management

Defense Science Board Task Force on Defense Software - November 2000

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C5.2.3.5.6.3   Review of Software-Intensive Programs

"An independent expert review team shall review programs and report on technology and development risk, cost, schedule, design, development, project management processes and the application of systems and software engineering best practices. The team shall report their findings directly to the PM and the PEO or equivalent management official. DUSD(S&T) shall manage the team, composed of a small group of software systems engineering and technology experts."

C2.6.8   Independent Expert Review of ACAT I-III Software Intensive Programs

"The acquisition strategy shall describe the planned use of independent expert reviews for all ACAT I through ACAT III software intensive programs."

DoD 5000.2-R - June 10, 2001

Policy (cont.)

- **WHO? - independent expert review team**
- **WHAT? - shall review programs and report on**
  - technology and development risk
  - cost
  - schedule
  - design
  - development
  - project management processes
  - the application of systems and software engineering best practices
- **FOR? - The team shall report their findings directly to the**
  - PM and the
  - PEO or
  - equivalent management official
- **BY? - A DUSD(A&T) managed team**
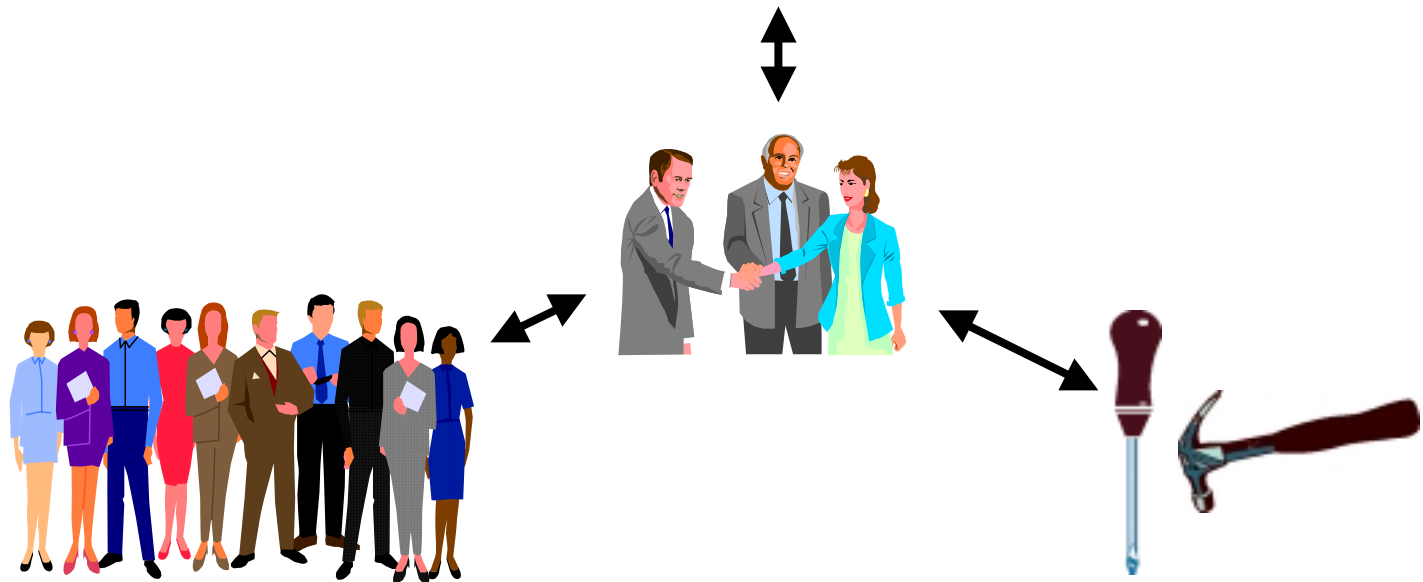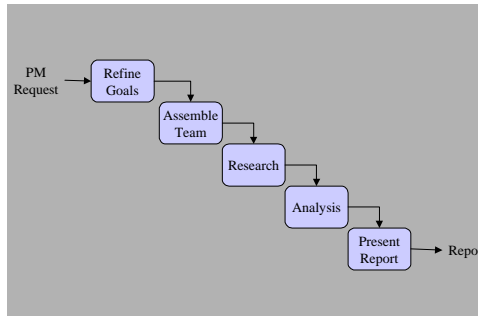 - Small group of software systems engineering and technology experts

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- **Perspectives**
  - Process
  - People
  - Tools / Technology
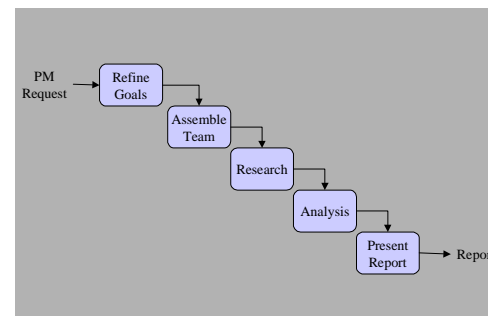 - Culture

The Process

- **Input**
  - A need from program management

- **The steps**
  - Refine IEPR goals and issues to be addressed
  - Assemble a team
  - Research - site visits, interviews, document review
  - Analysis - create the report(s)
  - Present report(s)

- **Output**
  - The report(s)

- **Team lead**
  - Familiarity with IEPR process, team leadership, report writing, and presentation skills
- **Team member skills**
  - Domain specific
  - Assessment issue specific
  - Organization knowledge
  - Generalist
- **Independent and objective**

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Tri Service Assessment Initiative (TAI) - Issue Area Typology

Environment	Regulatory, Workplace, Political
Mission Requirements	Stability, Dependencies
Financial	Funding, Budget
Resources	Personnel, Facilities, Tools, Products
Management	Acquisition Strategy, Project Planning, Contracting/Subcontracting
Technical Process	Capability, Conformance, Enhancement
Technical Product	Product Line, Quality, Safety
Schedule	Progress, Dependencies
User / Customer	Satisfaction, Training
Project / Team Specific	Project/Team Defined

Analysis Techniques

- Findings, risks, and recommendations
    - Finding is based on two or more observations and is validated
    - Conclusion is based on an analysis of findings
    - Risk is a potential impact to the program
    - Problem is something already impacting the program
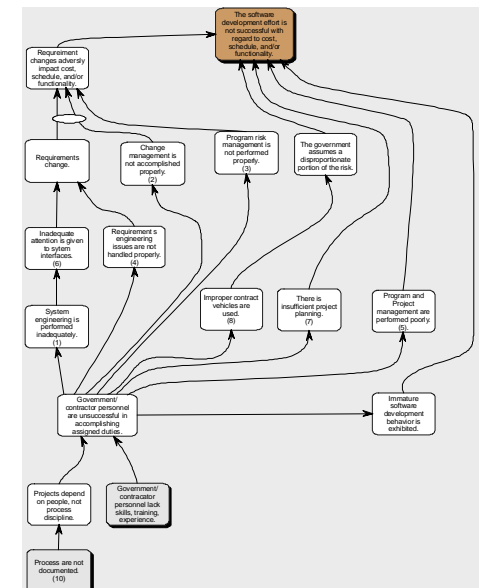   - Recommendation is a mitigation action

Analysis Techniques (cont.)

- Theory of Constraints (ToC) Current Reality Tree
  - STSC identified ToC as a best of breed technology
    - For performing analysis
    - For reaching agreement
    - For communicating that agreement
  - Cause and effect diagram
  - Identifies root causes of risks and problems
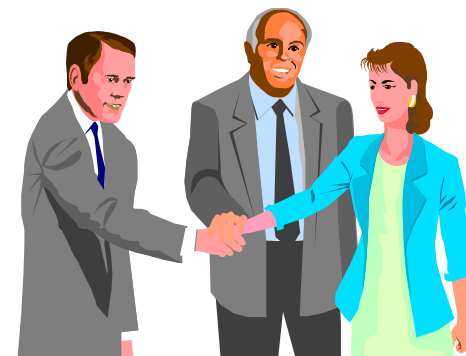 - Used to prioritize recommendations

IEPR Culture

- **IEPR team tasked with providing recommendations to the PM***
  - Well formed teams bring multiple viewpoints and experiences to the PM
- **Self help for the PM**
  - Owner of the report is the PM
  - Not an audit
- **Team of experts working for the PM**
  - Someone for the PM to talk to
  - Peers of the PM working in a non-threatening way

* PM is the person (PEO, PM, or other) who requested the IEPR

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	Peer Review	IEPR
Scope	Technical work package	Program
Mechanics	Moderator Technical checklist	Team lead Issue taxonomy
Culture	Peers of developer	Independent experts
Goal	Early defect removal	Increase program stability and reduce risk

Comparison with Process Assessments

|	Process Assessment	IEPR
Scope	Organization	Program or project
Measures	Potential capability	Actual practice, future risks
Support Needed	Lots (Man Months)	Minimal
Covers	Processes	Processes + More (e.g., plans, execution, technical issues)
Criteria	Standard, published	No standard, PM selected
Certification	Yes, focus of assessment. Report focuses on certification issues.	No. Report focuses on recommendations for achieving PM's goals.

- **What is an IEPR?**
- **What are the benefits of an IEPR?**
  - The project exam
  - Program manager comments
- **What is the cost of an IEPR?**
- **Typical findings**
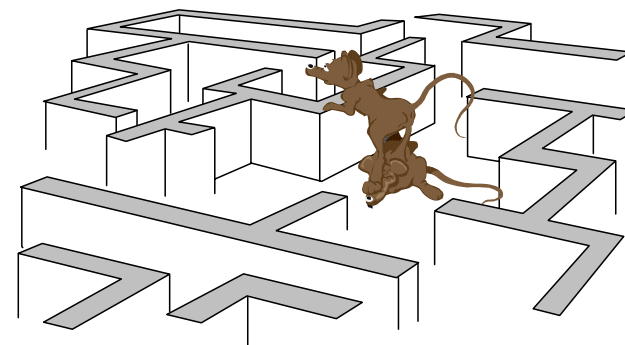
Benefits: The Project Exam

- **Identifies strengths and weaknesses**
- **Provides sanity check of current activities**
- **Can help avoid pitfalls**
- **Can be accomplished based on:**
  - Crisis
  - Periodic/Preventative
  - Milestone decision support
- **Done for you, not to you**
- **Best practice**

Most cost effective technique for helping program management buy/build software better!

- **"Tough but fair."**

- **"The cost to my organization was minimal…the benefit in my mind far outweighed the cost."**

- **"You provided a true, fair, and objective assessment of the condition of this program. With nothing to gain and no axe to grind [your] impartial analysis was our biggest benefit."**
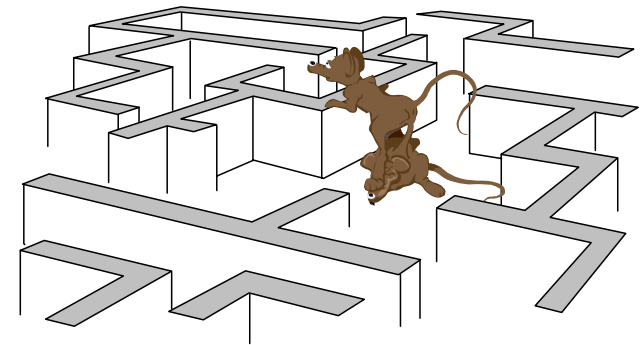
- **What is an IEPR?**

- **What are the benefits of an IEPR?**

- **What is the cost of an IEPR?**

  - Costs

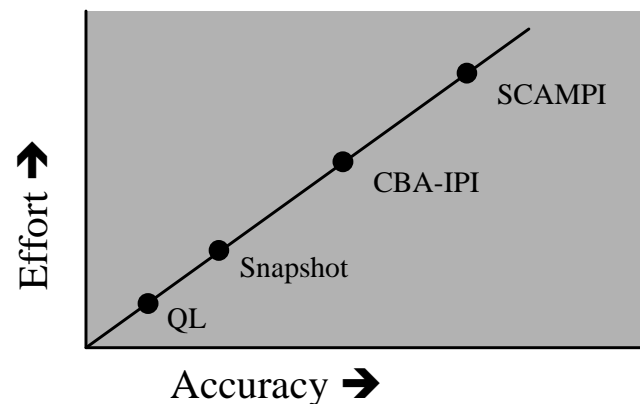 - Cost of Quality

  - Risks

- **Typical findings**

Costs

- **Typical ~$70K**
  - Varies with scope (# of issues and requested depth of analysis) and size of assessment team
- **Minimal prep time and impact on the assessed organization**
- **Comparisons**
  - All vary with scope (# of KPAs) and size of assessment team
  - CMM "Quick Look"   - ~$25K
  - CMM "Snapshot"   - ~$50K
  - CMM CBA-IPI   - ~$100K
  - CMMI SCAMPI   - ~$150K

Effort vs Accuracy: QL, Snapshot, CBA-IPI, SCAMPI

Cost of Quality

- **Quality - getting it right**
- **COQ = Failure + Appraisal + Prevention**
  - Failure costs - when you did not get it right the first time
  - Appraisal costs - evaluating if you got it right
  - Prevention costs - preventing problems from occurring
- **IEPRs are used in all three modes**

- **Scope (aka chicken & egg)**
  - Important for team selection - in essence the PM must have some idea what areas are to be reviewed before the IEPR begins

- **Weak process**
  - Importance of team's collective competence far overshadows the repeatability of the process

- **Insufficient time**
  - The assessment team must have sufficient time to be able to fully understand the issues facing the PM
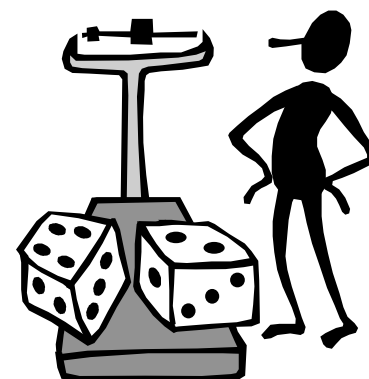
- **Too much time**
  - Must scope the issue areas so that the assessment occurs within the decision cycle of the PM

- **Scheduling**
  - Coordinating the schedules of the individual assessment team members and the program office is always difficult

- **Confidentiality**
  - If requestor is other than the PM. Address by finalizing the report with the PM and then co-presenting (with the PM) the report to the requestor
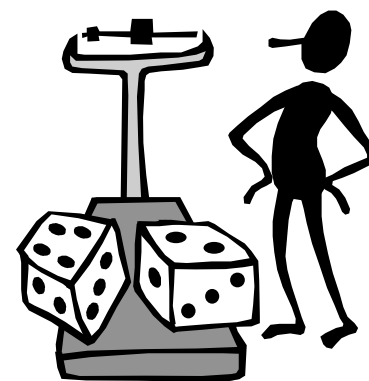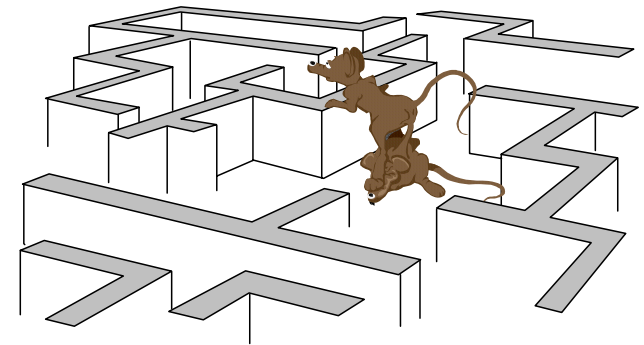
- **What is an IEPR?**
- **What are the benefits of an IEPR?**
- **What is the cost of an IEPR?**
- **Typical findings**
  - DoD Enterprise Analysis
  - STSC Findings

- **Tri-service Assessment Initiative results**
  - Formal systemic analysis of 21 TAI assessments
  - Briefed 30-April-02 (McGarry)
    - Available on the conference CD

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- **STSC results**
  - Program office (not the contractor) is frequently the problem
  - Program office lacks necessary expertise
    - Software acquisition/development experience
    - Systems engineering for software programs expertise
  - Both program office and contractor lack management discipline
    - General lack of management processes - ad hoc management
    - Management plans are often shelfware
    - Unmanaged requirements volatility

Contact Information

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